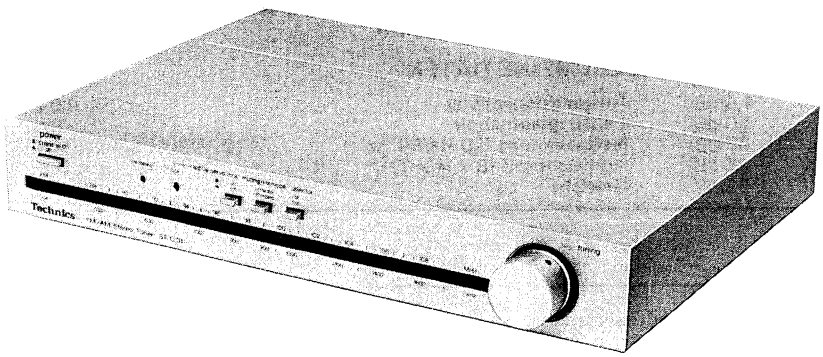
ORDER NO. SD7902-1510

Service Manual

FM/AM Stereo Tuner

ST-C01

(E), (EG), (X), (XA), (XAL),
(XGH), (XGF), (XE), (EB)



* The models ST-C01 (E, EG) are available in Scandinavia and European only.
* The models ST-C01 (X, XA) are available in Asia, Latin America, Middle East and Africa only.
* The model ST-C01 (XAL) is available in Australia only.
* The model ST-C01 (XGH) is available in Holland only.
* The model ST-C01 (XGF) is available in France only.
* The model ST-C01 (XE) is available in United Kingdom only.
* The model ST-C01 (EB) is available in Belgium only.

TECHNICAL SPECIFICATIONS

Specifications are subject to change without notice for further improvement.

[DIN 45 500]

FM TUNER SECTION

Frequency range		88 ~ 108 MHz
Antenna terminals		300Ω (balanced), 75Ω (unbalanced)
Sensitivity		
S/N 30 dB		1.9μV (300Ω), 1.2μV (75Ω)
S/N 26 dB		1.7μV (300Ω), 1.1μV (75Ω)
S/N 20 dB		1.5μV (300Ω), 0.9μV (75Ω)
IHF usable sensitivity		1.9μV (IHF '58)
IHF S/N 46 dB stereo quieting sensitivity		20μV (75Ω)
Total harmonic distortion	**MONO**	0.1%
	STEREO	0.15%
S/N	**MONO**	68 dB (IHF: 75 dB)
	STEREO	63 dB (IHF: 70 dB)
Frequency response		20 Hz ~ 15 kHz, +0.5 dB, −2.0 dB 20 Hz ~ 13 kHz, ±1.5 dB
Alternate channel selectivity		75 dB
Capture ratio		1.0 dB
Image rejection at 98 MHz		50 dB
IF rejection at 98 MHz		85 dB
Spurious response rejection at 98 MHz		75 dB
AM suppression		55 dB
Stereo separation	**1 kHz** 45 dB, **10 kHz**	35 dB
Leak carrier	**19 kHz**	−35 dB (−37 dB, IHF)
	38 kHz	−50 dB (−37 dB, IHF)
Limiting point		1.4μV
Bandwidth	**IF amplifier**	180 kHz
	FM demodulator	1000 kHz
Channel balance (250 Hz ~ 6300 Hz)		±1.0 dB

AM TUNER SECTION

Frequency range	525 ~ 1605 kHz
Sensitivity (S/N 20 dB)	30μV, 250μV/m
Selectivity	30 dB
Image rejection at 1000 kHz	50 dB
IF rejection at 1000 kHz	40 dB

GENERAL

Output voltage	0.5V
Power consumption	8W
Power supply (50 Hz/60 Hz)	110V/120V/220V/240V 240V only for Australia
Dimensions (W x H x D)	297 x 49 x 255mm (11 11/16 x 1 15/16 x 10 1/32) inch
Weight	3.2 kg (7.1 lb.)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

TECHNISCHE DATEN

Spezifikationen können infolge von Verbesserungen ohne Ankündigung geändert werden.

[DIN 45 500]

UKW-TUNERTEIL

Frequenzgang		88 ~ 108 MHz
Antennenanschluss		300Ω (symmetrisch), 75Ω (unsymmetrisch)
Empfindlichkeit		
30 dB Rauschabstand		1,9μV (300Ω), 1,2μV (75Ω)
26 dB Rauschabstand		1,7μV (300Ω), 1,1μV (75Ω)
20 dB Rauschabstand		1,5μV (300Ω), 0,9μV (75Ω)
Empfindlichkeit nach IHF		1,9μV (IHF '58)
46 dB Rauschabstand utilisable Empfindlichkeit nach IHF		20μV (75Ω), STEREO
Klirrfaktor	**MONO**	0,1%
	STEREO	0,15%
Rauschabstand		
	MONO	68 dB (IHF: 75 dB)
	STEREO	63 dB (IHF: 70 dB)
Frequenzgang		20 Hz ~ 15 kHz, +0,5 dB, −2,0 dB
		20 Hz ~ 13 kHz, ±1,5 dB
Selektivität		75 dB
Gleichwellen-Selektion		1,0 dB
Spiegelfrequenzunterdrückung bei 98 MHz		50 dB
ZF-Festigkeit bei 98 MHz		85 dB
Unselektivität-Dämpfung bei 98 MHz		75 dB
AM-Unterdrückung		55 dB
Kanaltrennung	**1kHz**	45 dB. **10 kHz** 35 dB
Hilfsträgerdämpfung (Pilotton)		
	19 kHz	−35 dB (−37 dB, IHF)
	38 kHz	−50 dB (−37 dB, IHF)
Begrenzungseinsatz		1,4μV
Bandbreite	**ZF-Verstärker**	180 kHz
	Ratiodetektor	1000 kHz
Kanalabweichung (250 Hz ~6300 Hz)		±1,0 dB

AM-TUNERTEIL

Frequenzgang	525 ~ 1605 kHz
Empfindlichkeit (20 dB Rauschabstand)	30μV, 250μV/m
Selektivität	30 dB
Spiegelfrequenz-Selektion bei 1000 kHz	50 dB
ZF-Festigkeit bei 1000 kHz	40 dB

ALLGEMEINE DATEN

Ausgangssapannung	0,5V
Leistungsaufnahme	8W
Netzspannung (50 Hz/60 Hz)	110V/120V/220V/240V
Abmessungen (B x H x T)	297 x 49 x 255 mm
Gewicht	3,2 kg

CARACTERISTIQUES TECHNIQUES

Sujet à changement sans préaris.

[DIN 45 500]

PARTIE TUNER FM

Gamme reçue		88 ~ 108 MHz
Impédance d'antenne		300Ω (symétrique) 75Ω (asymétrique)
Sensibilité		
Signal/bruit 30 dB		1,9μV (300Ω), 1,2μV (75Ω)
Signal/bruit 26 dB		1,7μV (300Ω), 1,1μV (75Ω)
Signal/bruit 20 dB		1,5μV (300Ω), 0,9μV (75Ω)
IHF Sensibilité		1,9μV (IHF '58)
IHF Sensibilité pour S/B 46 dB		20μV (75Ω), STÉRÉO
Distorsion harmonique total		
MONO		0,1%
STEREO		0,15%
Signal/bruit	**MONO**	68 dB (IHF: 75 dB)
	STEREO	63 dB (IHF: 70 dB)
Réponse de fréquence		20 Hz ~ 15 kHz, +0,5 dB, −2,0 dB
		20 Hz ~ 13 kHz, ±1,5 dB
Sélectvité en canaux alternés		75 dB
Taux de capture		1,0 dB
Réjection de fréquence image à 98 MHz		50 dB
Réjection FI à 98 MHz		85 dB
Réjection de réception non sélective à 98 MHz		75 dB
Suppression AM		55 dB
Séparation stéréophonique	**1 kHz**	45 dB, **10 kHz** 35 dB
Courant porteur de dispersion	**19 kHz**	−35 dB (−37 dB, IHF)
	38 kHz	−50 dB (−37 dB, IHF)
Point limite		1,4μV
Largeur de bande	**Amplificateur FI**	180 kHz
	Démodulateur FM	1000 kHz
Equilibrage de canaux (250 Hz ~ 6300 Hz)		±1,0 dB

PARTIE TUNER AM

Gamme reçue	525 ~ 1605 kHz
Sensibilité (Rapport S/B 20 dB)	30μV, 250μV/m
Sélectivité	30 dB
Réjection de fréquence image à 1000 kHz	50 dB
Réjection FI à 1000 kHz	40 dB

GENERALITES

Tention de sortie	0,5V
Consommation	8W
Alimentation (50 Hz/60 Hz)	110V/120V/220V/240V
Dimensions (L x H x P)	297 x 49 x 255 mm
Poids	3,2 kg

- **Precautions for installation:**
  Keep the preamplifier and power amplifier cords, speaker cord and input/output cord as far away from the AM bar antenna as possible. Noise may otherwise increase in AM reception mode.

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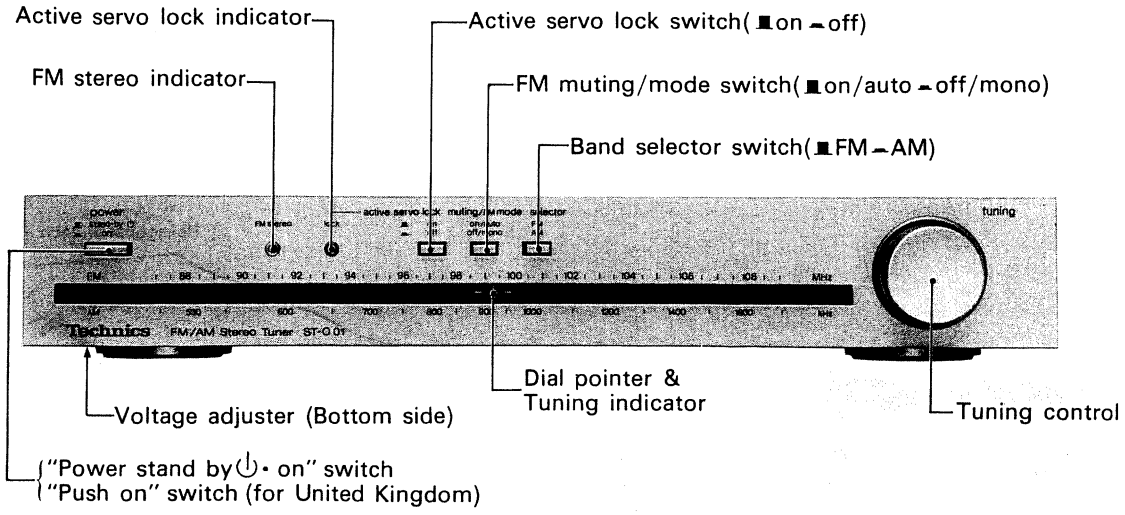
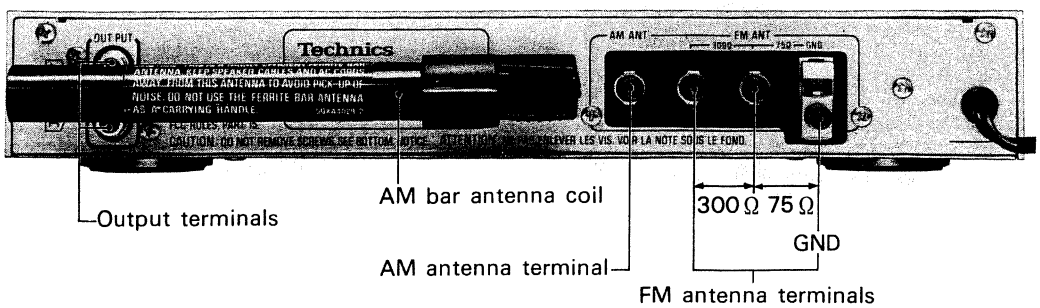
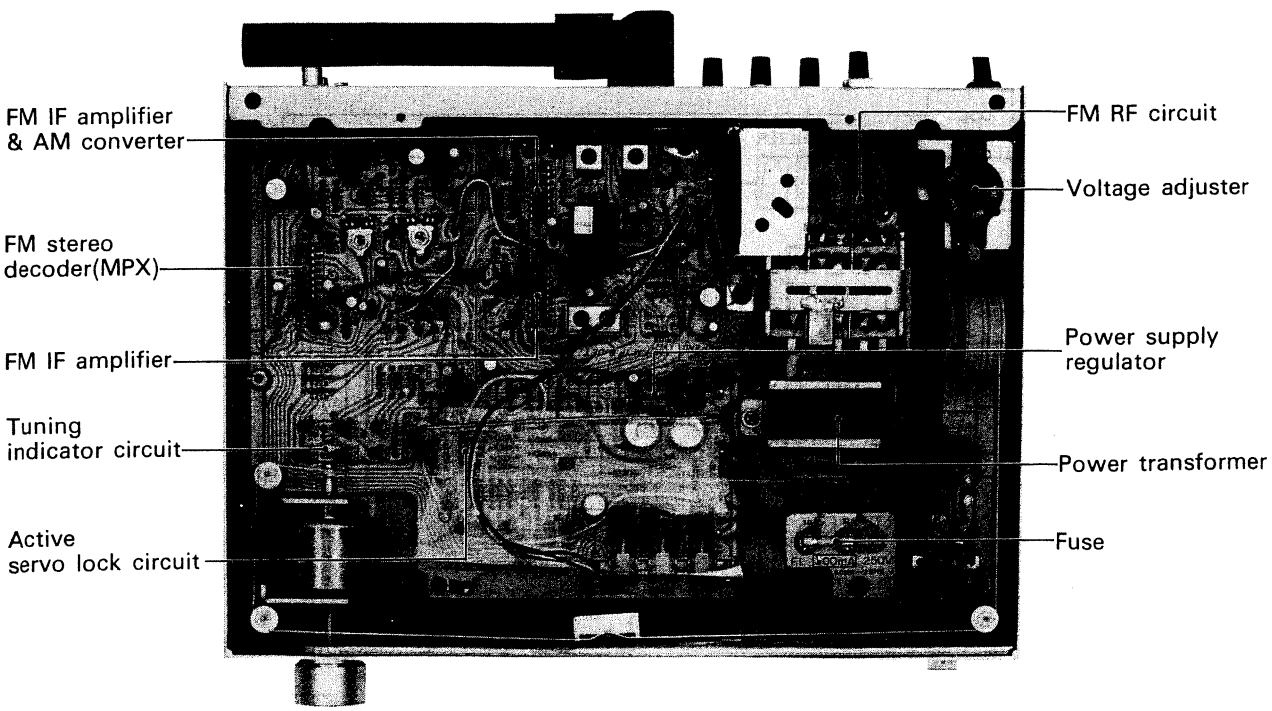
■ LOCATION OF CONTROLS







- **For further remark, the products for Australia [XAL] are not provided with voltage adjuster.**

■ TO REMOVE PRINTED CIRCUIT BOARD

1. Remove the bottom board from the set.
2. Loosen the tuning knob setscrew with a hexagonal wrench and then pull out the knob. (fig. 1)
3. Remove the 7 setscrews (① ~ ⑦ in fig. 2) used to secure the printed circuit board on the cabinet.
4. Remove the 2 setscrews (⑧, ⑨ in fig. 3) used to fasten the rear panel.
5. Pull the printed circuit board backwards along with the rear panel. Then the printed circuit board can be removed from the cabinet.
6. When installing the printed circuit board, reverse the procedure 1 ~ 5.

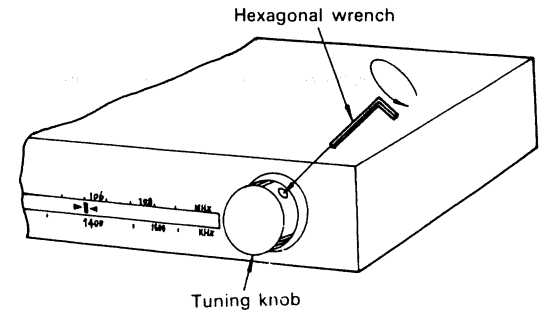


Fig. 1

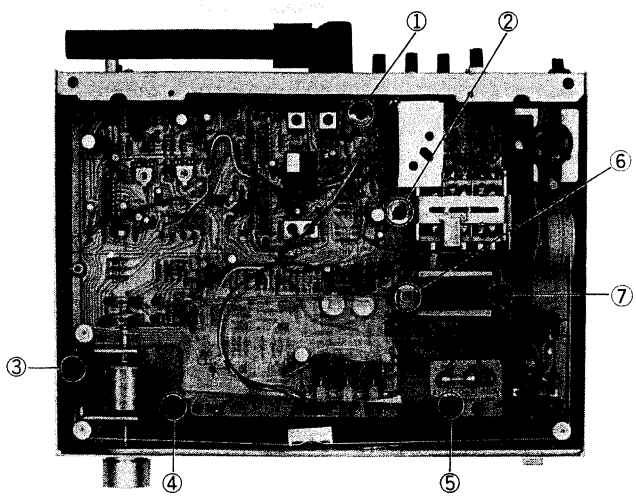


Fig. 2

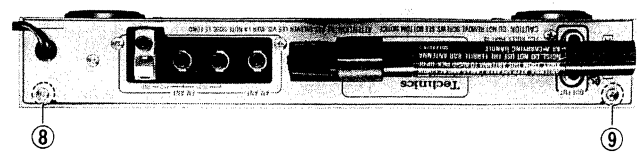
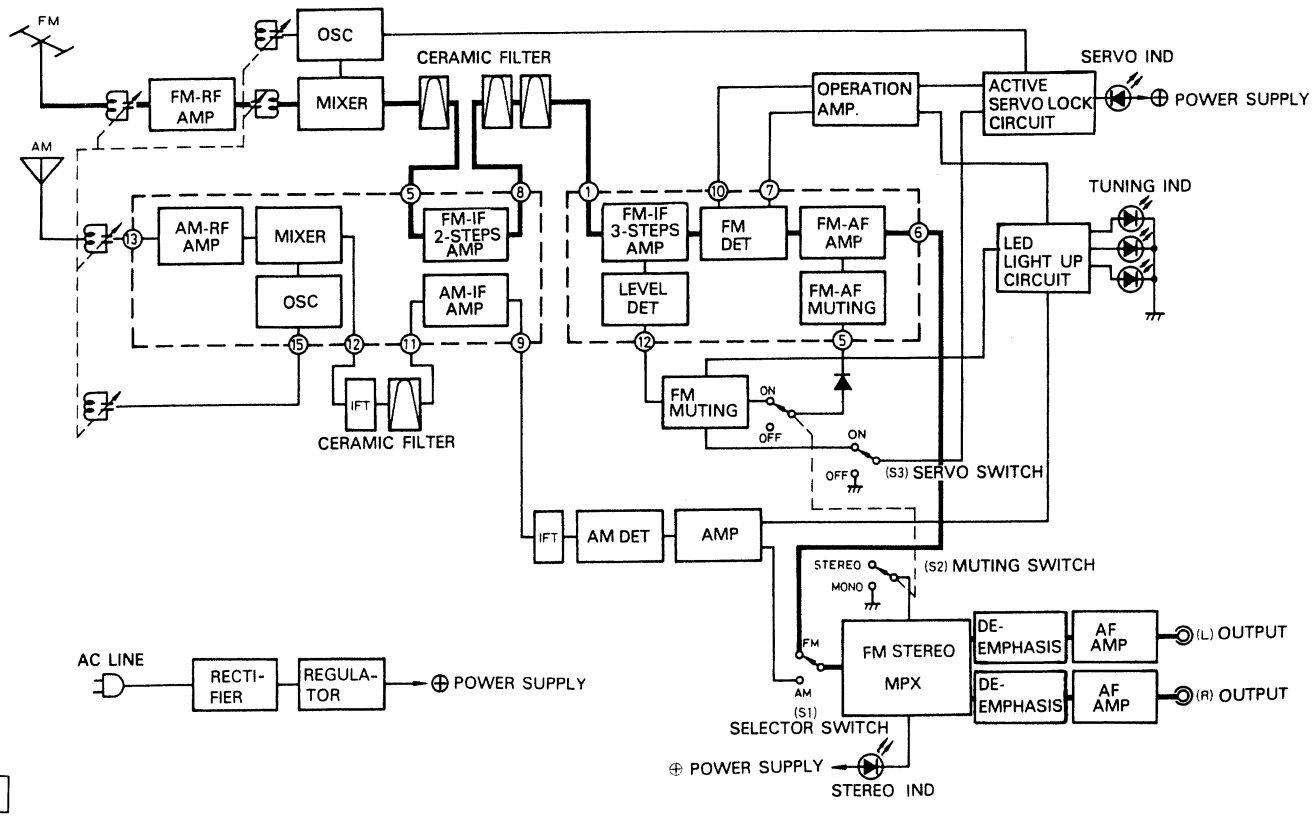


Fig. 3

■ BLOCK DIAGRAM



■ TECHNICAL GUIDE

(A) ACTIVE SERVO LOCK CIRCUIT

This circuit is designed to maintain the exact tuning point even in case of frequency drift in the set or at the broadcasting station.

It watches the S curve of the FM IF detector and shifts the voltage to its original level if it is deflected from the reference voltage thus keeping the set in optimum "Tuned" condition at all times.

1. No signal reception mode

IC301 is dual operational amplifier plus voltage amplifier.

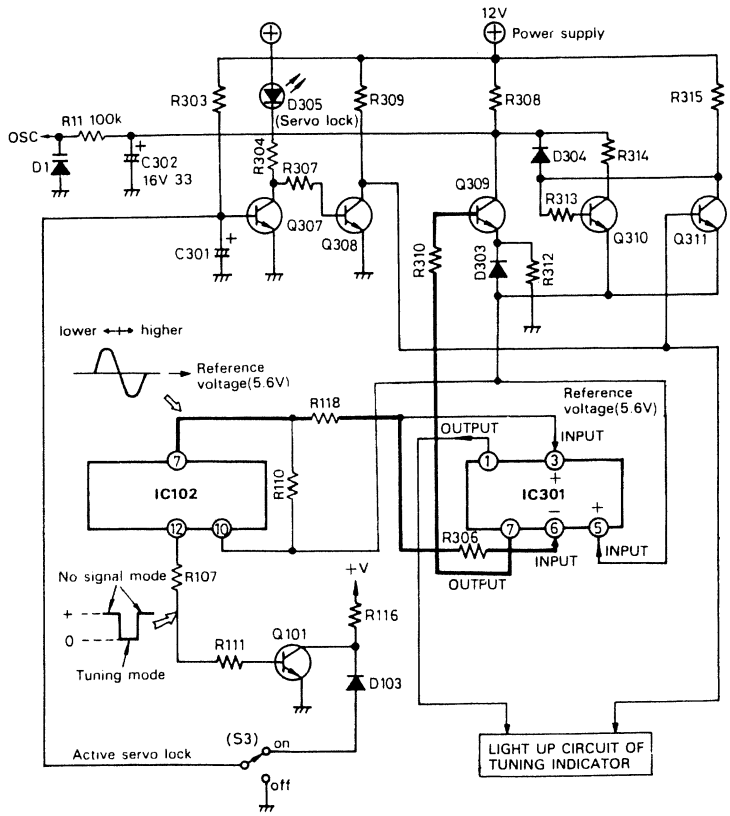
A reference voltage of about 5.6V is applied from terminal ⑩ of IC102 to terminal ⑤ of IC301. The IF detector output voltage is fed from terminal ⑦ of IC102 to terminals ⑥ and ③ of IC301. (Since this unit is a quadrature detection type, the output voltage at terminal ⑦ is about 5.6V in "No signal" and "Exact tuned" condition.)

IC301 detects the difference between the detector output voltage and the reference voltage to obtain an amplified difference voltage at terminal ⑦ of IC301.

This voltage controls Q309 which is turned off in the "Exact tuned" and in the "No signal" mode. (Reference voltage and detector output voltage are the same.)

Q101 located near IC102 is a switching transistor to operate in accordance with the FM-IF signal level.

It is ON in the "No signal" mode as its base potential is high at that time, and it turns OFF only, when the input level of the FM-IF signal reaches a certain level.



(Active servo lock circuit)
Fig. 4

With the active servo lock switch "ON", and Q101 "ON", both the collector voltage of Q101 and the base voltage of Q307 are 0V (ground potential), while Q307 is OFF.

Consequently, Q308 is ON, Q311 is OFF and Q310 is ON, and voltage is being applied to the variable capacity diode D1 as in Fig. 5.

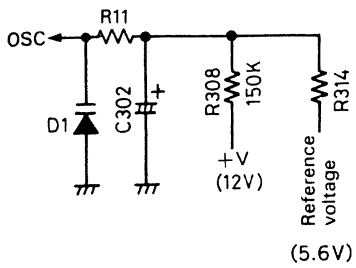
2. Signal reception mode

As explained above, Q101 turns OFF when a signal is received, causing the collector voltage to rise. D103 is reverse-biased and current stops to flow. In other words, the base of Q307 is electrically disconnected from the collector of Q101.

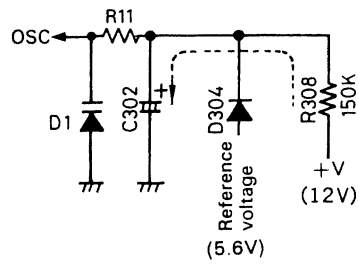
This causes C301 to be charged through R303. About 2 or 3 seconds later, Q307 turns ON and the servo lock circuit starts to operate.

Then, servo lock indicator D305 light up.

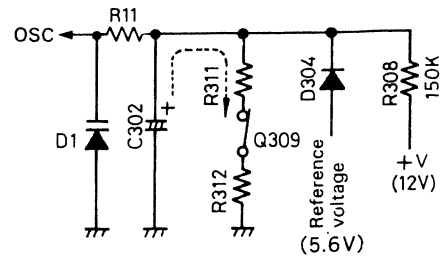
When Q307 is ON, then Q308 is OFF, Q311 is ON and Q310 is OFF and a constant voltage is applied to D1 as shown in Fig. 6.



(No signal mode)
Fig. 5



(Exact tuning & deviation to lower frequency)
Fig. 6



(Deviation to higher frequency)
Fig. 7

3. Deviation to higher frequency

If the frequency is deflected upward, the FM-IF detector output voltage (voltage at IC102 terminal ⑦) drops, while the output voltage at terminal ⑦ of IC301 rises above the reference voltage (5.6V). Then Q309 turns ON, resulting in the circuit as shown in Fig. 7. The voltage across D1 drops, causing the capacity to increase and the frequency of the local oscillator circuit to become lower, thus shifting the frequency back to the correct tuning point.

4. Deviation to lower frequency

If the frequency is deflected to the lower side, the if detector voltage goes up, dropping the output voltage at terminal ⑦ of IC301 below the reference level and Q309 turns OFF. C302 starts to charge up (see fig. 6). The voltage across D1 increases, capacity of D1 decreases, which causes the oscillator frequency to go up to the correct tuning point.

MODE	Q101	Q307	Q308	Q311	Q310	Q309	C302	D1 (CAPACITY)
NO SIGNAL	ON	OFF	ON	OFF	ON	OFF	FULLY CHARGED	CONSTANT
EXACT TUNING	OFF	AFTER 3 SEC ON	AFTER 3 SEC OFF	AFTER 3 SEC ON	AFTER 3 SEC OFF	OFF	FULLY CHARGED	CONSTANT
FREQUENCY IS HIGHER	OFF	ON	OFF	ON	OFF	ON	DISCHARGING	↑ UP
FREQUENCY IS LOWER	OFF	ON	OFF	ON	OFF	OFF	CHARGING	↓ DOWN

(B) TUNING INDICATOR CIRCUIT

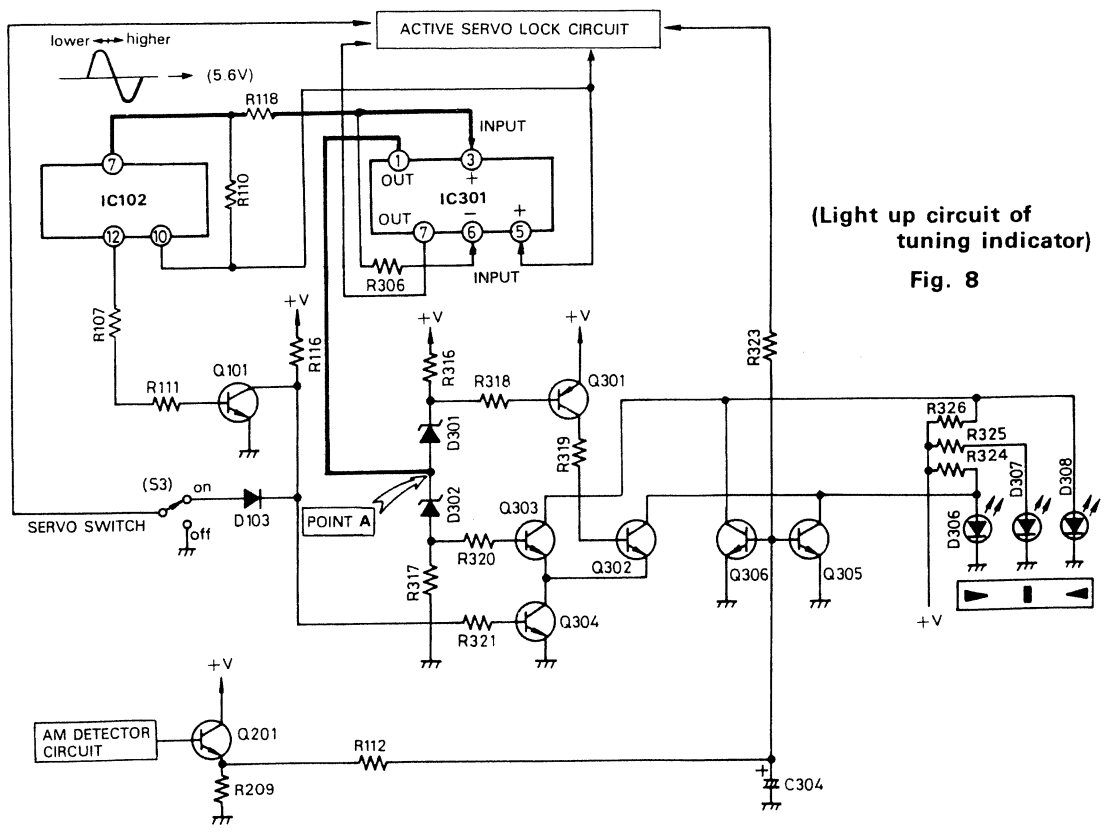
This circuit is designed to activate the arrow shaped indicator LED'S (▶◀) in place of conventionally employed meters. Since the circuit is interlocked with the active servo lock circuit, it is necessary to be familiar with the active servo lock circuit.

1. No signal mode

As explained in section (A)-1 "Active servo lock circuit", Q101 is ON in "no signal" mode. Therefore Q304 is OFF. This is important. Also remember that Q307 in the active servo lock circuit is OFF in "no signal" mode.
At that time, the collector voltage of Q307 is plus and it causes Q308 to turn ON. Accordingly, the voltage added to Q305 and Q306 via R323 becomes 0V (ground potential), and both transistors are OFF. That is, all tuning indicators are showing. (▶❙◀)

2. Exact tuning

The output voltage from terminal ① of IC301 (see fig. 8) is applied to point A, causing Q301 and Q303 to turn ON. Q302 turns ON when Q301 is turned ON. Also, in exact tuning mode Q101 is OFF as previously explained.
When Q101 is OFF, Q304 is ON, and accordingly, the collectors of Q303 and Q302 drop to 0V (ground potential), and the arrow tuning indicators go out and only the pointer indicator remains illuminated. (❙)



(Light up circuit of tuning indicator)

Fig. 8

3. Deviation to lower frequency

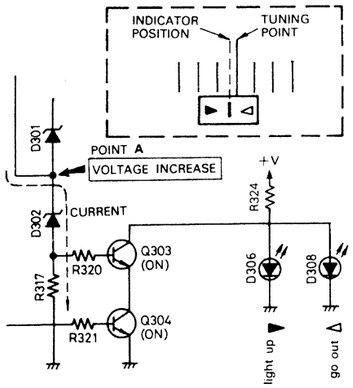
The voltage at terminal ① of IC301, that is, the voltage at point A increases. D301 looses its Zener effect and Q301 turns OFF as it is not biased. When Q301 is OFF, Q302 is OFF, too.
Therefore, the ▶ shaped indicator D306 lights up.
When the voltage at point A rises, the Zener effect of D302 becomes greater, and then Q303 is kept biased and turned ON. Accordingly, the ◀-mark LED (D308) goes out as its anode is of ground potential. That means you have to turn the dial in the direction of the ▶ -mark (higher frequendy side).

4. Deviation to higher frequency

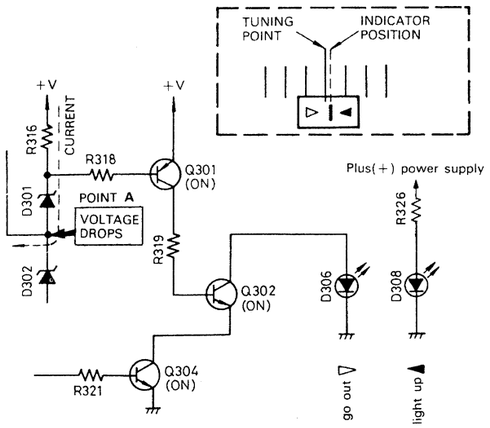
This time, the voltage at point A drops, D302 looses its Zener effect and Q303 turns OFF. Conversely the Zener effect of D301 increases causing Q301 to be biased and Q301 turns ON. Subsequently, Q302 turns ON. Then, the ▶-mark LED goes out, while the ◀ -mark LED lights up. That means you have to turn the dial in the direction of the ◀ -mark (lower frequency side).

5. AM reception

With no signal received, the emitter voltage of Q201 is low, then Q305 and Q306 is not biased, so the arrow mark LED lights up.
When the detection voltage rises with AM tuned, the emitter voltage of Q201 increases, therefore the bias applied to Q305 and Q306 also becomes greater. In complete tuning condition, Q305 and Q306 turn ON and both of the arrow mark LED's go out.



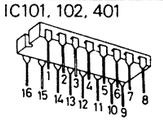
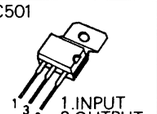
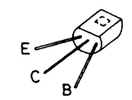
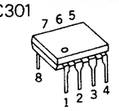
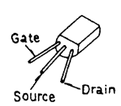
(Deviation to lower frequency)
Fig. 9



(Deviation to higher frequency)
Fig. 10

MODE	Q101	Q301	Q302	Q303	Q304	Q305	Q306	TUNING INDICATOR	SERVO INDICATOR
NO SIGNAL	ON	ON	ON	ON	OFF	OFF	OFF	▶|◀	——
EXACT TUNING	OFF	AFTER 3 SEC ON	ON	ON	ON	OFF	OFF	|	LIGHT UP
FREQUENCY IS LOWER	OFF	ON	OFF	ON	ON	OFF	OFF	▶|	——
FREQUENCY IS HIGHER	OFF	ON	ON	OFF	ON	OFF	OFF	|◀	——
A. M.	ON	ON	ON	ON	OFF	ON	ON	|	——

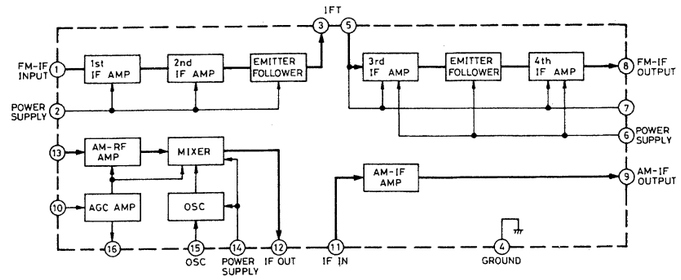
■ TERMINAL GUIDE OF TRANSISTORS AND IC'S

AN217,AN377,AN363N	SVIFS7812C	2SC1674 , 2SC1675 2SC945 , 2SA733
IC101, 102, 401 	IC501  1.INPUT 2.OUTPUT 3.COMMON	Q2,3,101,201,301~311, 401,402 
SVIμPC4558C	2SK49	
IC301 	Q1  Gate Drain Source	

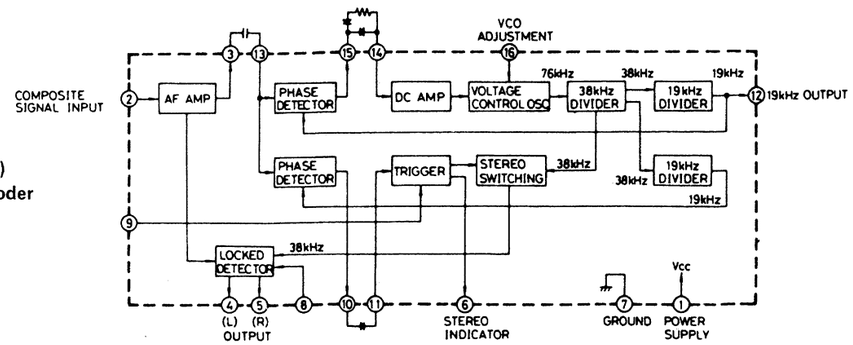
■ BLOCK DIAGRAM OF IC'S

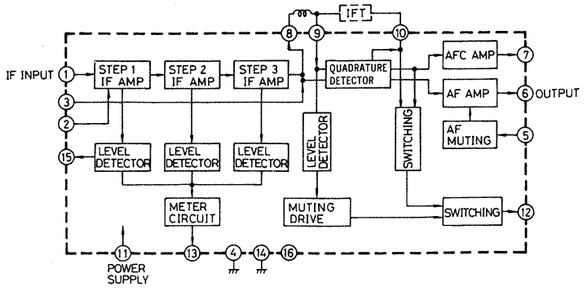
- This is the basic block diagram of the inside circuit of IC. In an actual circuit, there may be sometimes idle terminals or some different functions other than the basic circuit.

IC101 (AN217)
FM IF Amplifier &
AM Converter

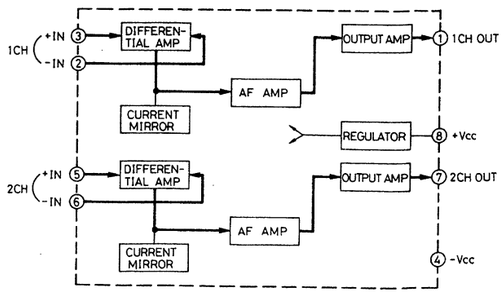


IC401 (AN363)
FM Stereo Decoder
(MPX)





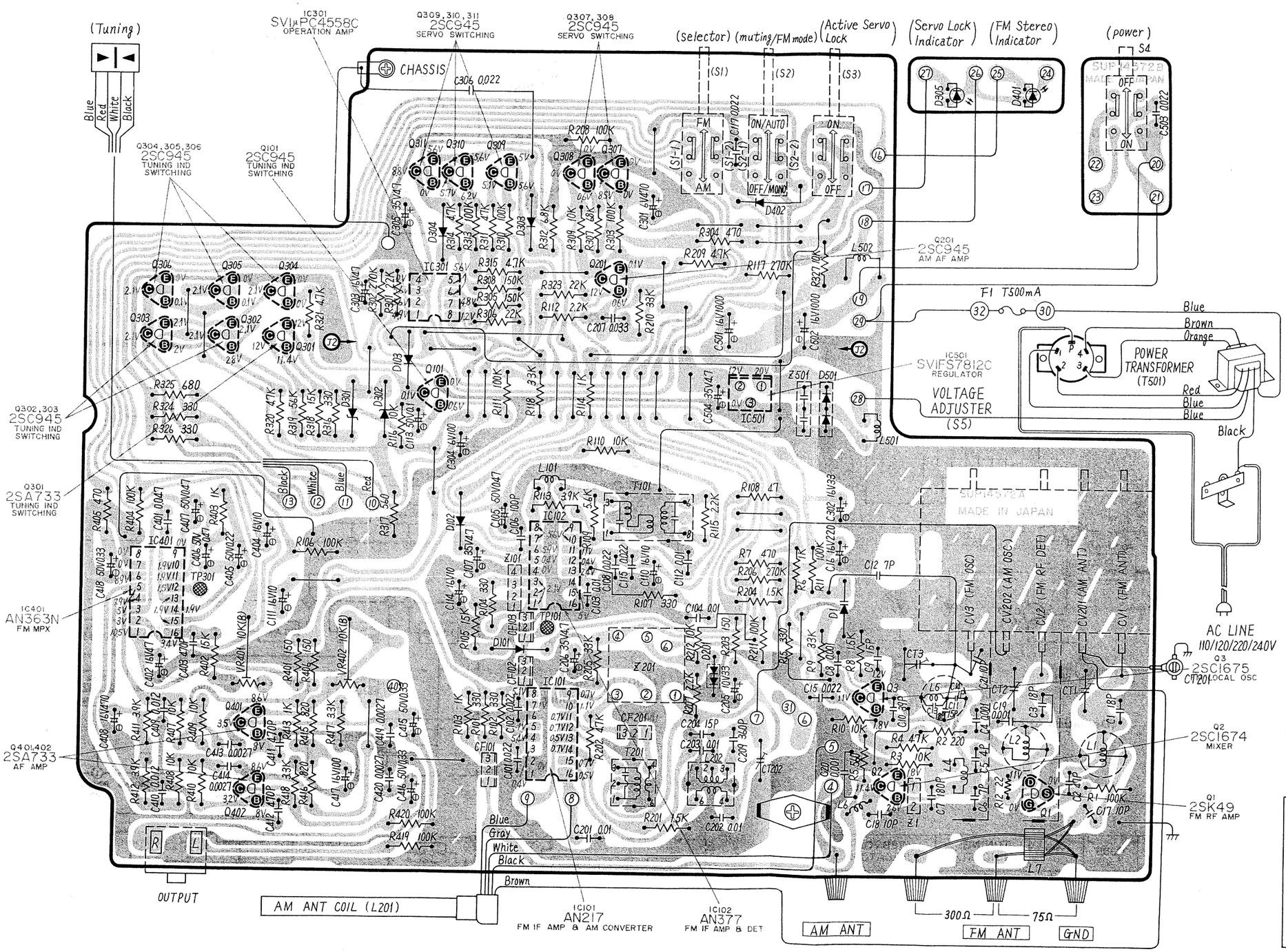
IC102 (AN377)
FM IF Amplifier & Detector



IC301 (SVIUPC4558C)
DC Amplifier

■ PRINTED CIRCUIT BOARD WIRING VIEW

Earth(Ground) Lines



● Notes of schematic diagram

Notes:

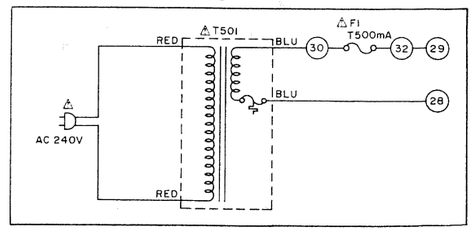
1. **S1-1 ~ S1-2** : Selector switch in **"FM"** position.
2. **S2-1, S2-2** : FM muting/mode switch in **"on/auto"** position.
3. **S3** : Active servo lock switch in **"on"** position.
4. **S4** : Power source secondary switch in "off (stand-by)" position.
5. **S5** : Voltage adjuster switch in **"240V"** position.
   110V ⟷ 120V ⟷ 220V ⟷ 240V
   (For further remark, the products for Australia [XAL] are not provided with voltage adjuster switch.)
6. ⚠ indicates that only parts specified by the manufacturer be used for safety.
7. Indicated voltage are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

- Figures in [ ] stand for DC voltage in FM no-signal mode.
- Figures in ( ) stand for DC voltage in AM mode.
- Figures in < > stand for DC voltage in FM stereo signal reception mode.
- Figures in (( )) stand for DC voltage in servo lock circuit operation.

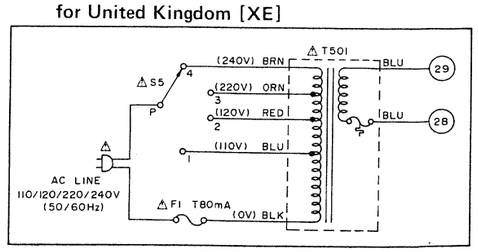
8. Signal lines ⟹ FM ⟹ AM ⟹ AF
9. To represent transistors **Q** is used instead of **TR**. (Ex. TR1 → Q1)

● Power source circuit of products for Australia and United Kingdom

for Australia [XAL]

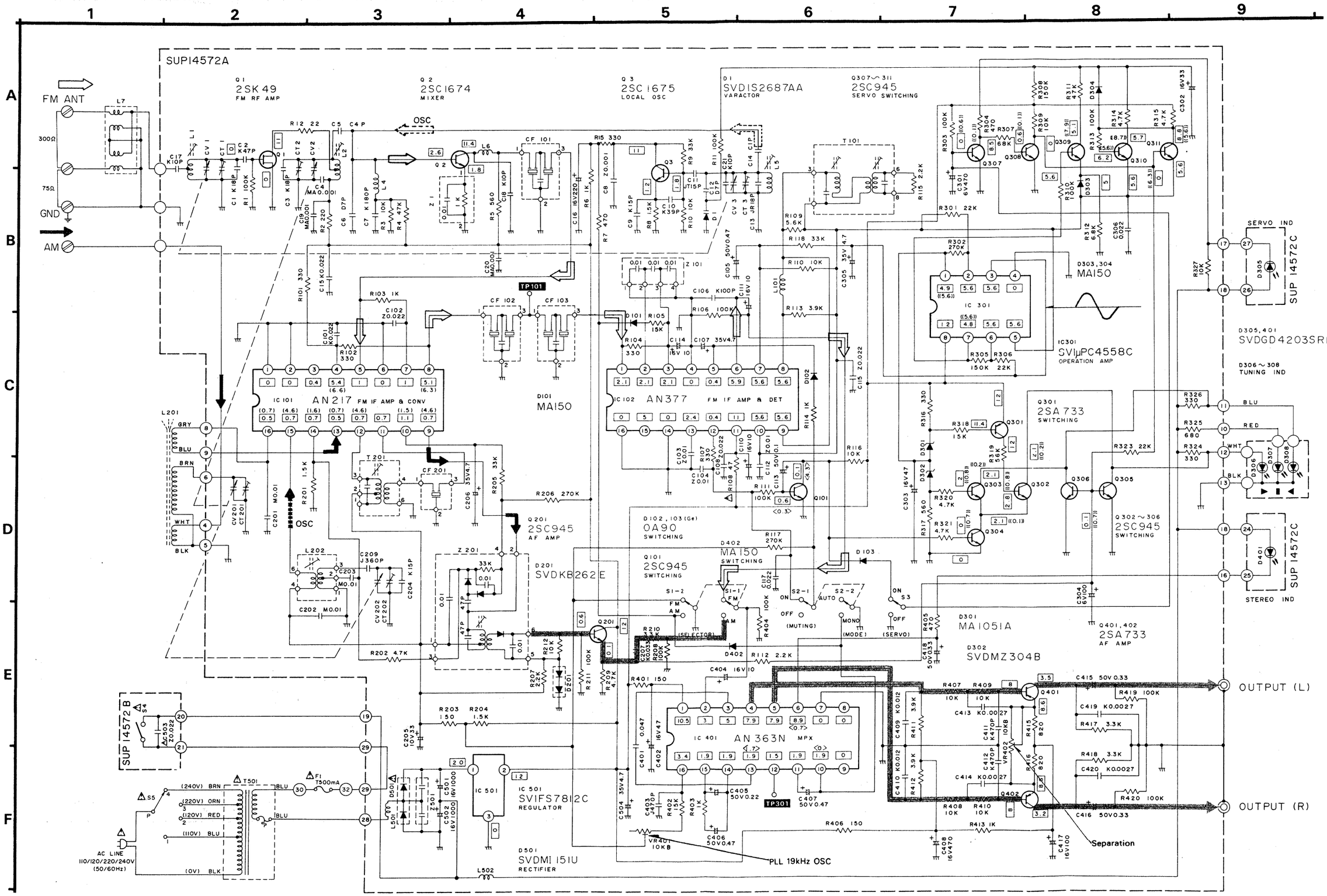


for United Kingdom [XE]

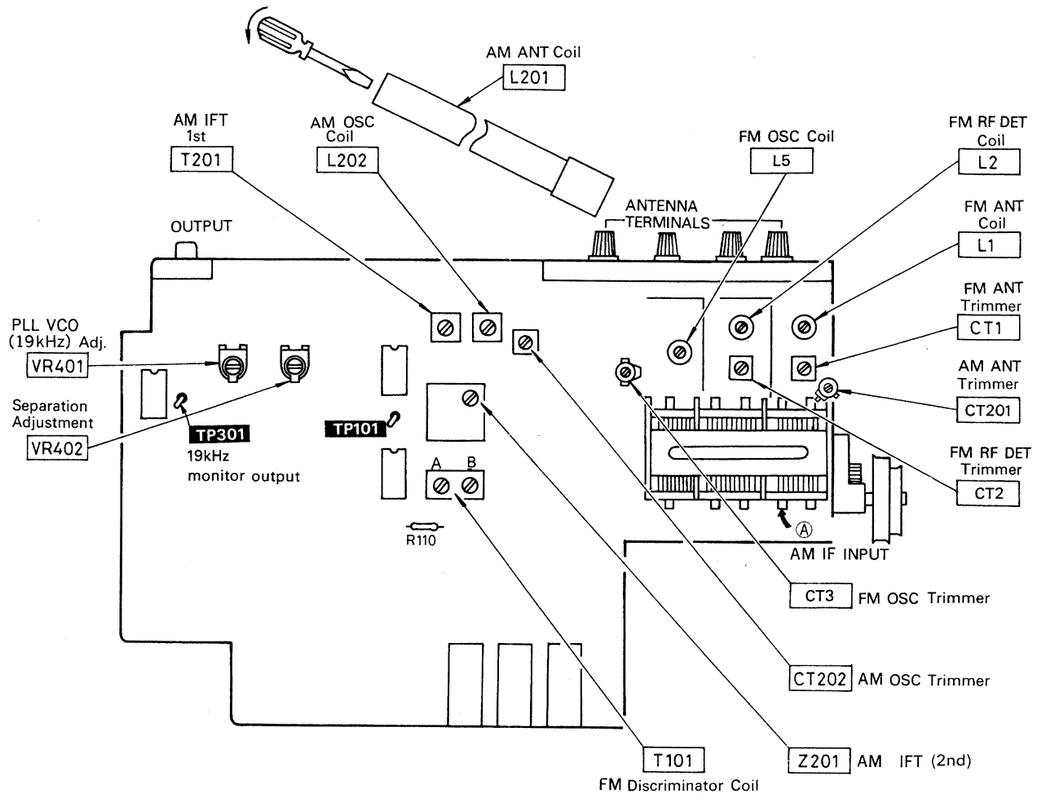


■ SCHEMATIC DIAGRAM

* This schematic diagram may be modified at any time with the development of new technology.



■ ALIGNMENT POINTS



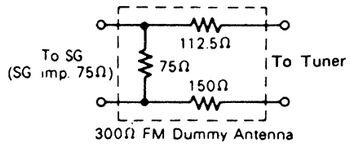


Fig. 11
(Abb. 11)

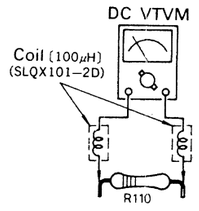


Fig. 12
(Abb. 12)

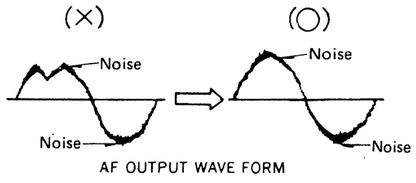
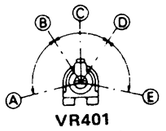


Fig. 13
(Abb. 13)



A – B, D – E: Stereo OFF Position.
B – D: Stereo ON Position (Indicator Lighting).
C: Adjust Point of Pilot Circuit.

Fig. 14
(Abb. 14)

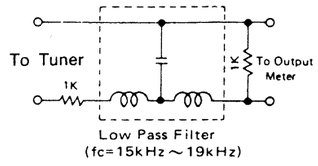


Fig. 15
(Abb. 15)

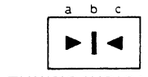


Fig. 16
(Abb. 16)

■ ALIGNMENT INSTRUCTIONS — ENGLISH

Notes:
1. Band selector switch..... { AM (AM Alignment) / FM (FM Alignment)
2. FM muting & mode switch .... off/mono
3. Active servo lock switch..... off
4. Maintain line voltage at rated voltage.
5. 300Ω FM dummy antenna..... Refer to fig. 11
6. Output of signal generator should be no higher than necessary to obtain an output reading.
7. Adjust the antenna coil (L201) position by using a screwdriver so that it is at approximately 25 degress to the rear panel.

	AM/FM SIGNAL GENERATOR CONNECTION	AM/FM SIGNAL GENERATOR FREQUENCY	DIAL SETTING	INDICATOR (VTVM, SCOPE or DISTORTION METER)	ADJUSTMENT POINTS	REMARKS
	AM ALIGNMENT					
1	High side through 0.001μF to **AM** antenna trimmer terminal. (point Ⓐ). Common to chassis.	450kHz (30% Mod.) with 400 Hz) For United Kingdom to 468kHz	Point of non-inter-ference	Connect AC VTVM or scope to "OUTPUT" terminals.	T201 (1st IFT) Z201 (2nd IFT)	Adjust for maximum output.
2	Fashion loop of several turns of wire and radiate signal into loop of tuner.	600kHz (30% Mod.) with 400Hz)	600kHz	Connect AC VTVM or scope to "OUTPUT" terminals.	L202 (OSC Coil) L201 (ANT Coil)	Adjust for maximum output, adjust ferrite core of L201 by screwdriver.
3	Fashion loop of several turns of wire and radiate signal into loop of tuner.	1500kHz (30% Mod.) with 400Hz)	1500kHz	Connect AC VTVM or scope to "OUTPUT" terminal.	CT202 (OSC Trimmer) CT201 (ANT Trimmer)	Adjust for maximum output. Repeat steps (2) and (3).
	FM IF ALIGNMENT					
4		No-Signal	Point of non-inter-ference	Connect DC VTVM to R110 resistor. (Refer to fig. 12)	T101 (DISCRI IFT) A	•FM muting/mode switch to "on/auto" position. •Adjust T101 (A) core so that voltage measured in signal mode is 0V in 300mV range.
	FM RF ALIGNMENT					
5	Connect to FM 300Ω antenna terminal through 300Ω FM dummy antenna.	90MHz (100% Mod.) with 400Hz) weak input	90MHz	Connect scope to "OUTPUT" terminal.	L5 (OSC Coil) L2 (RF DET Coil) L1 (ANT Coil)	•Add weak input so that noise is included in the output wave form. •Make the adjustment so that the output wave form is vertically symmetrical. (Fig. 13) •Repeat the steps 5 and 6 until the frequency correctly matches the dial scale.
6		106MHz (100% Mod. with 400Hz) weak input	106MHz	Connect scope to "OUTPUT" terminal.	CT3 (OSC Trimmer) CT2 (RF DET Trimmer) CT1 (ANT Trimmer)	
	FM MONO DISTORTION ALIGNMENT					
7	Connect to FM 300Ω antenna terminal through 300Ω FM dummy antenna.	100MHz (100% Mod. with 400Hz) Apply 60dB (1mV) to tuner	100MHz	Connect distortion meter to "OUTPUT" terminals.	T101 (DISCRI IFT) A T101 (DISCRI IFT) B	•Set the FM muting/mode switch to "on/auto" and then check step 4 in no signal mode. •If it is deflected, re-adjust A (primary side) of T101. •Adjust T101 (B) core so that distortion of right and left channels are minimized.

FM MPX PILOT ALIGNMENT

	Using a frequency counter	Using alternate system
8	**1** 100MHz Non-modulated mono signal applied (60dB) tuner. **2** FM muting/mode switch to "on" **3** Connect frequency counter to **TP301** through resistor (100kΩ). **4** Adjust **VR401** to 19kHz ±30Hz.	**1** Apply stereo signal from generator or stereo station to tuner. **2** Adjust **VR401** until stereo indicator lights up. Cement arm of **VR401** as shown in fig. 14.

SEPARATION ALIGNMENT

	PREPARATIONS	ADJUSTING PROCEDURE
9	**1** Add 100MHz, 1kHz, 30% pilot 10% modulation, 60dB stereo signal to the tuner. **2.** Connect AC VTVM or scope to "OUTPUT" terminal through low pass filter. Refer to fig. 15	**1.** Set the FM muting/mode switch to "on/auto" and then adjust the tuning so that only tuning indicator **b** (fig. 16) lights up. **2** Adjust **VR402** so that **R** output is minimized when stereo modulator is in **L** (Lch. modulation) mode and that **L** output is minimized in **R** mode.

■ ABGLEICHANWEISUNGEN — DEUTSCH

(Für Deutschland)

Anmerkungen:

1. Bereichsschalter . . . . . { AM (MW abgleich) / FM (UKW Abgleich)
2. FM Muting/Mode-Schalter . off/mono
3. Active servo lock-Schalter . . off
4. Netzspannung auf ihren Sollwert halten.
5. UKW-Kunstantenne, 300 ohm . . . . . Vgl. Abb. 11.
6. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute Ablesung.
7. Mittels eines Schraubenziehers die Stellung der Antennenspule (L201) so einstellen, daß sie gegen die Rückenplatte einen Winkel von ca. 25° macht.

	AM/UKW MESSENDER		SKALENZEIGEREINSTELLUNG DES TUNER	ANZEIGEGEIRÄT (Röhrenvoltmeter oder Oszillograph ozw. Klirrfaktor-Meßgerät)	ABGLEICHSPUNKTE	BEMERKUNGEN
	ANSCHLUSS	FREQUENZ				
	MW-ABGLEICH					
1	Heißes Ende des Meßsenders über einen 0.001μF Kondensator an den AM Antenneneingang schließen. Kaltes Ende an Masse	450kHz (400Hz Modulat., 30%)	Kein Empfang	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schließen.	T201 (1. IFT) (A) Z201 (2. IFT)	Auf max. Ausgang abgleichen.
2	Das Meßsendersignal induktiv in den Tuner speisen. Hierzu behelfsmäßig eine Rahmenantenne fertigen und an den Eingang schließen.	600kHz (400Hz Modulat., 30%)	600kHz	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" schleißen.	L202 (Osc. Spule) L201 (Ant. Spule)	Auf max. Ausgang abgleichen. Den Ferritkern von L201 mit einem Schraubendreher justieren.
3	Das Meßsendersignal induktiv in den Tuner speisen. Hierzu behelfsmäßig eine Rahmenantenne fertigen und an den Eingang schließen.	1500kHz (400Hz Modulat., 30%)	1500kHz	Wechselstrom Röhrenvoltmeter oder Oszillograph über den Ausgang "OUTPUT" scheißen.	CT202 (Osc. Trimmer) CT201 (Ant. Trimmer)	Auf max. Ausgang abgleichen. Schritt (2) und (3) sing zu wiederholen.
	UKW ZF-ABGLEICH					
4		Kein Signal	Kein Empfang	Gleichspannungsmesser über den Ausgang R110 widerstand schließen. (Vgl. Abb. 12)	T101 (Diskriminator IFT) A	•FM muting/mode-Schalter auf "on/auto". •Den Kern von T101 (A) so justieren, daß die gemessene Spannung im signallosen Modus 0V im 300mV Bereich beträgt.
	UKW-HF-ABGLEICH					
5	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	87.5MHz (400Hz Modulat., 100%	87.5MHz (Frequenz min.	Oszillograph über den Ausgang "OUTPUT" schließen.	L5 (Osc. Spule)	•Einen schwachen Eingang geben, bei den Geräusch in der Ausgangswellenform enthalten wird. •So einstellen, daß die Ausgangswellenform vertikal symmetrisch wird. (Abb. 13) •Die Einstellung von 5, 6 und 7 wiederhoten, bis die Frequenz mit der Skala übereinstimmt.
6	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	90MHz (400Hz Modulat., 100%)	90MHz	Oszillograph über den Ausgang "OUTPUT" schließen.	L2 (Det. Spule) L1 (Ant. Spule)	
7	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen.	106MHz (400Hz Modulat.,	106MHz	Oszillograph über den Ausgang "OUTPUT" schließen.	CT3 (Osc. Trimmer) CT2 (Det. Trimmer) CT1 (Ant. Trimmer)	
	ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO					
8	Meßsender über eine Kunstantenne an den UKW-Antenneneingang schließen. Meßsender auf 60 dB (1mV) einstellen.	100MHz (400Hz Modulat., 100%)	100MHz	Klirrfaktor-Meßbrücke über den Ausgang "OUTPUT" schließen.	T101 (Diskriminator IFT) [A] T101 (Diskriminator IFT) [B]	•FM muting/mode-Schalter auf "on/auto" stellen, dann in signalloser Mode den Schritt 4 feststellen. •Wenn Abweichung vorliegt, A (primäre Seite) von T101 wieder einstellen. •T101 (B) Kern für minimale Verzerrung der rechten und linken Kanäle justieren.

UKW-STEREO-DEKODER-ABGLEICH

	Unter Verwendung eines Zählers	Alternativ-Meßmethode
9	1. Unmoduliertes Mono-Signal 100MHz in das Gerät speisen. 2. FM muting/mode-Schalter auf "on/auto" stellen. 3. Zähler über einen Widerstand 100K ohm an **TP301** schließen. 4. **VR401** auf 19kHz ±30Hz einstellen.	1. Stereosignal entweder von einem Stereogenerator oder einem Sender einspeisen. 2. **VR401** so einstellen, bis die Stereolampe auf leuchtet. Schleifer von **VR401** sichern, wie in Abb. 14 gezeigt.

KANALTRENNUNG-ABGLEICH

10	1. Das Gerät auf 100MHz, 1kHz 30%, Pilot 10% Modulation, 60dB Stereosignal einstellen. 2. Wechselstrom-Röhrenvoltmeter oder Oszillograph durch Tiefpaß filter (fc = 15 ~19kHz) an Ausgangsanschlüsse des Gerätes anschließen. (Vgl. Abb. 15)	3. Muting/FM mode-Schalter auf "on/auto" stellen, dann so abstimmen, daß nur abstimmanzeiger **b** (Fig. 16) aufleuchtet. 4. **VR402** auf minimale Anzeige des **R**-Ausgangs bei Stereomodulator in **L**-(L-Kanalmodulation) Modus, und auf minimale Anzeige des **L**-Ausgangs in **R**-Modus abgleichen.

■ INSTRUCTIONS D'ALIGNEMENT — FRANÇAIS

Notes:
1. Sélecteur de gamme ..... { AM (Alignement AM) / FM (Alignement FM)
2. Commutateur de silencieux/mode ..... off/mono
3. Commutateur de servo-verrouillage ..... off
4. Conserver la tension du secteur à la tension nominale.
5. Antenne fictive FM 300Ω ..... Voir fig.11.
6. Le signal du générateur ne doit pas être plus élevé qu'il n'est nécessaire à obtenir une lecture en sortie.
7. Régler la position de la bobine (L201) de l'antenne en utilisant un tournevis de telle sorte qu'elle soit environ à 25 degrés de la plaque arrière.

	AM/FM GENERATEUR		AIGUILLE SUR LE CADRAN	INDICATEUR (VOLTMETRE ELECTRONIQUE OSCILLOSCOPE OU DISTORSIONMETRE)	POINTS DE REGLAGE	OBSERVATIONS
	BRANCHEMENT	FREQUENCE				
	ALIGNEMENT AM					
1	Côté chaud, à travers 0.001μF, sur le trimmer de l'antenne AM, commum an shâssis	450kHz (modulé à 30% par 400Hz)	Point sans signal	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	T201 (1 transfo FI) Z201 (2 transfo FI)	Réglez au maximum de signal de sortie.
2	Faire une boucle de quelgues tours et rayonner le signal dans le cadre du l'ampli-tuner.	600kHz (modulé à 30% par 400Hz)	600kHz	C.A. voltmètre electronique ou oscilloscope sur prise de sortie de l'appareil.	L202 (bobine OSC) L201 (bobine ANT)	Réglez au maximum de signal de sortie. Régler le noyau ferrite de L201 à l'aide d'un tournevis.
3	Faire une boucle de quelgues tours et rayonner le signal dans le cadre du l'ampli-tuner.	1500kHz (modulé à 30% per 400Hz)	1500kHz	C.A. voltmètre électronique ou oscilloscope sur prise de sortie de l'appareil.	CT202 (trimmer OSC) CT201 (trimmer ANT)	Réglez au maximum de signal de sortie. Recommencez les étapes (2) et (3).
	ALIGNEMENT FI-FM					
4		Sans signal	Point sans signal	C.C. voltmètre sur prise R110 résistance. (Voir fig.12)	T101 (A) (transfo FI discri)	•Commutateur de silencieux sur "on/auto". •Régler le noyau T101 (A) de telle sorte que le voltage mesuré dans le mode sans signal, soit de 0V dans la gamme des 300mV.
	ALIGNEMENT RF-FM					
5	Branchez sur la prise d'antenne FM à traves une antenne fictive FM	90MHz (modulé à 100% par 400Hz) Entrée faible	90MHz	Oscilloscope sur prise de sortie du tuner.	L5 (bobine OSC) L2 (bobine DET) L1 (bobine ANT)	•Appliquer une entrée faible de telle sorte que le parasite soit compris dans la forme de l'onde de sortie. •Faire le réglage de telle sorte que la forme de l'onde de sortie soit verticalement symétrique. (Voir fig.13) •Refaire les réglages 5 et 6 jusqu'à ce que la fréquence corresponde correctement avec l'échells du cadran.
6	Branchez sur la prise d'antenne FM à travers une antenne fictive FM.	106MHz (modulé à 100% par 400Hz) Entrée faible	106MHz	Oscilloscope sur prise de sortie du tuner.	CT3 (trimmer OSC) CT2 (trimmer DET) CT1 (trimmer ANT)	
	REGLAGE DE LA DISTORSION FM EN MONO					
7	Branchez sur la prise d'antenne FM à travers une antenne fictive FM. Niveau de sortie du générateur 60 dB (1mV).	100MHz (modulé à 100% par 400Hz)	100MHz	Distorsiomètre sur prise de sortie du tuner.	T101 (Transfo FI discri.) [A] T101 (Transfo FI discri.) [B]	•Placer la commutateur Sourdine FM/Mode sur "on/auto" et vérifier l'étape 4 dans un mode sans signal. •S'il est déplacé, re-régler A (côté primaire) de T101. •Régler le noyou T101 (B) de telle sorte que la distorsion des canaux droit et gauche soit la plus faible.

ALIGNEMENT DU PILOTE MULTIPLEX FM

	Avec un fréquencemétre	Par un outre système
8	1. Signal mono 100MHz non modulé appliqué à l'appareil. 2. Commutateur de silencieux sur "on/auto". 3. Branchez le fréquencemètre sur **TP301** à travers une résistance de 100kΩ. 4. Régler **VR401** sur 19kHz ±30Hz.	1. Appliquez à l'appareil un signal stéréo provenant d'un gégérateur ou de la réception d'un émetteur. 2. Régler **VR401** jusqu à ce que l'indicateur de stéréophonic s'allume. Collez le curseur de **VR401** comme indiqué sur la fig.14.

REGLAGE DE LA SEPARATION DES CANAUX

	Préparations	Procédure de réglage
9	1. Ajouter 100MHz, 1kHz, Modulation, pilote 10%, signal stéréophonique 60dB, à lápparell. 2. Brancher un voltmètre électronique C.A. ou un oscilloscope aux bornes de sortie, par l'intermédiaire du filtre passe-bas (fc = 15 ~19kHz). Voir fig. 15.	1. Placer le commutateur Sourdine FM/Mode sur "on/auto" et refaire le ráglage de l'accord de telle sorte que seul le témoin d'accord **b** (Fig. 16) s'allume. 2. Régler **VR402** de telle sorte que la sortie droite soit minimale quand la commande d'accord stéréophonique est dans le mode gauche (modulation du canal gauche) et que la sortie gauche soit minimale dans mode droit.

■ REPLACEMENT PARTS LIST ····· Electric Parts

NOTES: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.

2. ⚠ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.		Part No.	Part Name & Description
INTEGRATED CIRCUITS			
IC101		AN217P-BB	IC, FM IF Amplifier & AM Converter
IC102		AN377N	IC, FM IF Amplifier
IC301		SVIUPC4558C	IC, DC Amplifier (Active servo lock)
IC401		AN363N	IC, FM Multiplex
IC501		SVIFS7812C	IC, Voltage Stabilizer
TRANSISTORS			
Q1		2SK49-H1	Transistor, FM RF Amplifier (FET)
Q2		2SC1674-M	Transistor, FM Mixer
Q3		2SC1675-L1	Transistor, FM Local Oscillator
Q101, 201, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311		**2SC945-P2**	Transistor, Muting, AM Buffer, Switching, & Servo Lock Circuitry (Use in ranks P1, P2 or R)
Q301, 401, 402		2SA733-P1	Transistor, Switching & AF Amplifier
DIODES			
D1		SVD1S2687AA	Diode, Variable Capacitance
D101,303,304, 402		MA150	Diode, Switching & Active Servo Lock
D102,103		0A90	Diode, Muting Switching
D201		SVDKB262E	Diode, AM AGC
D301		MA1051A	Diode, Zener 5.1V
D302		SVDMZ304B	Diode, Zener 4V
D305,401		SVDGD4203SRD	Light Emitting Diode, Servo Lock & Stereo
D501	⚠	SVDMI151U	Rectifier
COILS and TRANSFORMERS			
L1		SLD4P25-P	Coil, FM RF Detector, 1st
L2		SLD4P21-P	Coil, FM RF Detector, 2nd
L4,501		RLQY15G5-Y	Coil, Choke
L5		SLO4P55-P	Coil, FM Oscillator
L6		ELQ5A9	Coil, Choke
L7		SLAA4W1-3	Coil, FM Balun Antenna
L101		SLQW180-1K	Coil, Choke
L201		SLF2C21	Coil, AM Antenna
L202		SLO2C9-P	Coil, AM Oscillator
L502		SLQX101-2D	Coil, Choke
T101		SLI4D513-Z	Transformer, FM Discriminator
T201		SLI2C125-P	Transformer, AM IF
T501	⚠	SLT5J71	Transformer, Power Source
T501(XAL)only	⚠	SLT5J99	Transformer, Power Source

Ref. No.		Part No.	Part Name & Description
CERAMIC FILTERS			
CF101, 102		SVFE107MM A	Ceramic Filter, FM 10.7MHz, Red
		SVFE107MM B	Ceramic Filter, FM 10.67MHz, Blue
		SVFE107MM C	Ceramic Filter, FM 10.73MHz, Orange
CF103		SVFE107ML A	Ceramic Filter, FM 10.7MHz, Red
		SVFE107ML B	Ceramic Filter, FM 10.67MHz, Blue
		SVFE107ML C	Ceramic Filter, FM 10.73MHz, Orange
		(Use in pair ranks)	as same as CF101, 102 and CF103.)
CF201		SVFSFU450B	Ceramic Filter, AM 450kHz
CF201(XE)only		SVFSFU468B	Ceramic Filter, AM 468kHz
COMPONENT COMBINATIONS			
Z1		EXRP103P102C	Component Combination, 1kΩ/0.01μF
Z101		EXF3SL04C	Component Combination, 0.01μF(X3)
Z201		SLI9F101-Z	Component Combination, AM IFT & Detector
Z501		EXRFS203ZS	Component Combination, 0.01μF (X2)
VARIABLE RESISTORS			
VR401		EVTS3MA00B14	PLL VCO 19kHz Adjustment
VR402		**EVLS3AA00B14**	Separation Adjustment
VARIABLE CAPACITORS			
CV1, 2, 3, 201, 202		ECV5MD34X72G	Tuning Gang, FM/AM
CT1, 2, 202		SVCTY121B269	Ceramic Trimmer
CT3		ECV1ZW06X32E	Ceramic Trimmer, FM Oscillator
CT201		ECV1ZW20X32	Ceramic Trimmer, AM Antenna
FUSE			
F1	⚠	XBA2C05TRO	Fuse, T500mA (250V)
F1(XE)only	⚠	XBAS2A00801	Fuse, T80mA (250V)
SWITCHES			
S1, 2, 3		SSH359	Switch, Servo Lock, Muting & Selector
S4	⚠	SSH97	Switch, Power Source
S4(XE)	⚠	SSH121	Switch, Power Source
S5	⚠	ESE372	Switch, Voltage Adjuster
Except products for (XAL)			

Ref. No.		Part No.	Part Name & Description
RESISTORS			
R1		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R2		**ERD25TJ221**	Carbon, 220Ω, 1/4W, ±5%
R3		**ERD25TJ103**	Carbon, 10kΩ, 1/4W, ±5%
R4		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ±5%
R5		**ERD25TJ561**	Carbon, 560Ω, 1/4W, ±5%
R6		**ERD25TJ102**	Carbon, 1kΩ, 1/4W, ±5%
R7		**ERD25TJ471**	Carbon, 470Ω, 1/4W, ±5%
R8		**ERD25TJ152**	Carbon, 1.5kΩ, 1/4W, ±5%
R9		**ERD25TJ333**	Carbon, 33kΩ, 1/4W, ±5%
R10		**ERD25TJ103**	Carbon, 10kΩ, 1/4W, ±5%
R11		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R12		**ERD25TJ220**	Carbon, 22Ω, 1/4W, ±5%
R15		**ERD25TJ331**	Carbon, 330Ω, 1/4W, ±5%
R101, 102		**ERD25TJ331**	Carbon, 330Ω, 1/4W, ±5%
R103		**ERD25TJ102**	Carbon, 1kΩ, 1/4W, ±5%
R104		**ERD25TJ331**	Carbon, 330Ω, 1/4W, ±5%
R105		**ERD25TJ153**	Carbon, 15kΩ, 1/4W, ±5%
R106		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R107		**ERD25TJ331**	Carbon, 330Ω, 1/4W, ±5%
R108	⚠	ERD18FJ470	Carbon, 47Ω, 1/8W, ±5%
R109		**ERD25TJ562**	Carbon, 5.6kΩ, 1/4W, ±5%
R110		**ERD25TJ103**	Carbon, 10kΩ, 1/4W, ±5%
R111		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R112		**ERD25TJ222**	Carbon, 2.2kΩ, 1/4W, ±5%
R113		**ERD25TJ392**	Carbon, 3.9kΩ, 1/4W, ±5%
R114		**ERD25TJ102**	Carbon, 1kΩ, 1/4W, ±5%
R115		**ERD25TJ222**	Carbon, 2.2kΩ, 1/4W, ±5%
R116		**ERD25TJ103**	Carbon, 10kΩ, 1/4W, ±5%

Ref. No.		Part No.	Part Name & Description
R117		**ERD25TJ274**	Carbon, 270kΩ, 1/4W, ±5%
R118		**ERD25TJ333**	Carbon, 33kΩ, 1/4W, ±5%
R201		**ERD25TJ152**	Carbon, 1.5kΩ, 1/4W, ±5%
R202		**ERD25TJ472**	Carbon, 4.7kΩ, 1/4W, ±5%
R203		**ERD25TJ151**	Carbon, 150Ω, 1/4W, ±5%
R204		**ERD25TJ152**	Carbon, 1.5kΩ, 1/4W, ±5%
R205		**ERD25TJ333**	Carbon, 33kΩ, 1/4W, ±5%
R206		**ERD25TJ274**	Carbon, 270kΩ, 1/4W, ±5%
R207		**ERD25TJ222**	Carbon, 2.2kΩ, 1/4W, ±5%
R208		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R209		**ERD25TJ472**	Carbon, 4.7kΩ, 1/4W, ±5%
R210		**ERD25TJ333**	Carbon, 33kΩ, 1/4W, ±5%
R211		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R212		**ERD25TJ103**	Carbon, 10kΩ, 1/4W, ±5%
R301		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ±5%
R302		**ERD25TJ274**	Carbon, 270kΩ, 1/4W, ±5%
R303		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R304		**ERD25TJ471**	Carbon, 470Ω, 1/4W, ±5%
R305		**ERD25TJ154**	Carbon, 150kΩ, 1/4W, ±5%
R306		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ±5%
R307		**ERD25TJ683**	Carbon, 68kΩ, 1/4W, ±5%
R308		**ERD25TJ154**	Carbon, 150kΩ, 1/4W, ±5%
R309		**ERD25TJ103**	Carbon, 10kΩ, 1/4W, ±5%
R310		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R311		**ERD25TJ473**	Carbon, 47kΩ, 1/4W, ±5%
R312		**ERD25TJ682**	Carbon, 6.8kΩ, 1/4W, ±5%

Ref. No.		Part No.	Part Name & Description
R313		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R314, 315		**ERD25TJ472**	Carbon, 4.7kΩ, 1/4W, ±5%
R316		**ERD25TJ331**	Carbon, 330Ω, 1/4W, ±5%
R317		**ERD25TJ561**	Carbon, 560Ω, 1/4W, ±5%
R318		**ERD25TJ153**	Carbon, 15kΩ, 1/4W, ±5%
R319		**ERD25TJ563**	Carbon, 56kΩ, 1/4W, ±5%
R320, 321		**ERD25TJ472**	Carbon, 4.7kΩ, 1/4W, ±5%
R323		**ERD25TJ223**	Carbon, 22kΩ, 1/4W, ±5%
R324		**ERD25TJ331**	Carbon, 330Ω, 1/4W, ±5%
R325		**ERD25TJ681**	Carbon, 680Ω, 1/4W, ±5%
R326		**ERD25TJ331**	Carbon, 330Ω, 1/4W, ±5%
R327		**ERD25TJ103**	Carbon, 10kΩ, 1/4W, ±5%
R401		**ERD25TJ151**	Carbon, 150Ω, 1/4W, ±5%

Ref. No.		Part No.	Part Name & Description
R402		**ERD25TJ153**	Carbon, 15kΩ, 1/4W, ±5%
R403		**ERD25TJ102**	Carbon, 1kΩ, 1/4W, ±5%
R404		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%
R405		**ERD25TJ471**	Carbon, 470Ω, 1/4W, ±5%
R406		**ERD25TJ151**	Carbon, 150Ω, 1/4W, ±5%
R407, 408		**ERD25TJ103**	Carbon, 10kΩ, 1/4W, ±5%
R409, 410		**ERD25TJ103**	Carbon, 10kΩ, 1/4W, ±5%
R411, 412		**ERD25TJ392**	Carbon, 3.9kΩ, 1/4W, ±5%
R413		**ERD25TJ102**	Carbon, 1kΩ, 1/4W, ±5%
R415, 416		**ERD25TJ821**	Carbon, 820Ω, 1/4W, ±5%
R417, 418		**ERD25TJ332**	Carbon, 3.3kΩ, 1/4W, ±5%
R419, 420		**ERD25TJ104**	Carbon, 100kΩ, 1/4W, ±5%

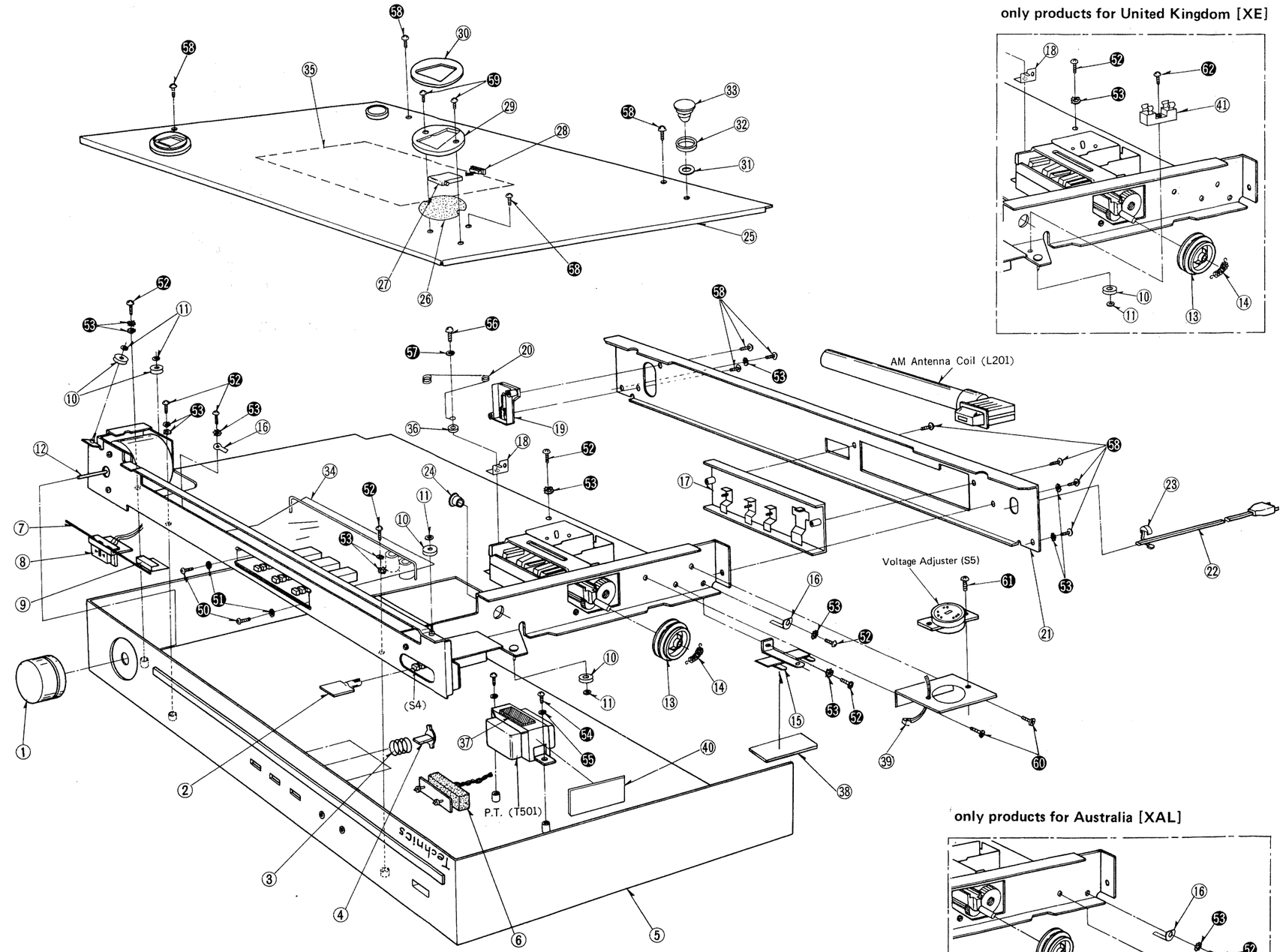
Ref. No.		Part No.	Part Name & Description
CAPACITORS			
C1		ECCD1H180KC	Ceramic, 18pF, 50V, ±10%
C2		ECCD1H470KC	Ceramic, 47pF, 50V, ±10%
C3		ECCD1H180KC	Ceramic, 18pF, 50V, ±10%
C4		ECKD1H102MDA	Ceramic, 0.001μF, 50V, ±20%
C5		ECCD1H040CC	Ceramic, 4pF, 50V, ±0.25pF
C6		ECCD1H070DC	Ceramic, 7pF, 50V, ±0.5pF
C7		ECCD1H181K	Ceramic, 180pF, 50V, ±10%
C8		ECKD1H102ZF	Ceramic, 0.001μF, 50V, +80 −20 %
C9		ECCD1H150KC	Ceramic, 15pF, 50V, ±10%
C10		ECCD1H390KC	Ceramic, 39pF, 50V, ±10%
C12		ECCD1H070DC	Ceramic, 7pF, 50V, ±0.5pF
C15		ECQM1H223KZ	Polyester, 0.022μF, 50V, ±10%
C16		**ECEA1CS221**	Electrolytic, 220μF, 16V
C17, 18		ECCD1H100KC	Ceramic, 10pF, 50V, ±10%
C19, 20		ECKD1H102MDA	Ceramic, 0.001μF, 50V, ±20%
C21		ECCD1H100KC	Ceramic, 10pF, 50V, ±10%
C101		ECQM1H223KZ	Polyester, 0.022μF, 50V, ±10%
C102		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80 −20 %
C103, 104		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80 −20 %
C105		**ECEA50ZR47**	Electrolytic, 0.47μF, 50V,
C106		ECCD1H101K	Ceramic, 100pF, 50V, ±10%
C107		**ECEA1JS4R7**	Electrolytic, 4.7μF, 63V
C108		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80 −20 %
C110, 111		**ECEA1HS100**	Electrolytic, 10μF, 50V
C112		ECKD1H103ZF	Ceramic, 0.01μF, 50V, +80 −20 %
C113		ECEA50ZR1	Electrolytic, 0.1μF, 50V
C114		**ECEA1HS100**	Electrolytic, 10μF, 50V
C115		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80 −20 %
C117		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80 −20 %
C201, 202		ECKD1H103MD	Ceramic, 0.01μF, 50V, ±20%

Ref. No.		Part No.	Part Name & Description
C203		ECKD1H103MD	Ceramic, 0.01μF, 50V, ±20%
C204		ECCD1H150KC	Ceramic, 15pF, 50V, ±10%
C205		**ECEA1CS330**	Electrolytic, 33μF, 16V
C206		**ECEA1JS4R7**	Electrolytic, 4.7μF, 63V
C207		ECQM1H333KZ	Polyester, 0.033μF, 50V, ±10%
C209		ECQS1361JZ	Polystyrene, 360pF, 125V, ±5%
C301		**ECEA0JS471**	Electrolytic, 470μF, 6.3V
C302		**ECEA1CS330**	Electrolytic, 33μF, 16V
C303		**ECEA1ES470**	Electrolytic, 47μF, 25V
C304		**ECEA1AS101**	Electrolytic, 100μF, 10V
C305		**ECEA1JS4R7**	Electrolytic, 4.7μF, 63V
C306		ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80 −20 %
C401		ECQM1H473KZ	Polyester, 0.047μF, 50V, ±10%
C402		**ECEA1ES470**	Electrolytic, 47μF, 25V
C403		ECQS1471JZ	Polystyrene, 470pF, 125V, ±5%
C404		**ECEA1HS100**	Electrolytic, 10μF, 50V
C405		ECEA50ZR22R	Electrolytic, 0.22μF, 50V
C406		**ECEA50ZR47**	Electrolytic, 0.47μF, 50V
C407		ECEA50MR47S	Electrolytic, 0.47μF, 50V
C408		**ECEA1CS471**	Electrolytic, 470μF, 16V
C409, 410		ECQM1H123KZ	Polyester, 0.012μF, 50V, ±10%
C411, 412		ECKD1H471KB	Ceramic, 470pF, 50V, ±10%
C413, 414		ECQM1H272KZ	Polyester, 0.0027μF, 50V, ±10%
C415, 416		ECEA50ZR33R	Electrolytic, 0.33μF, 50V
C417		**ECEA1ES101**	Electrolytic, 100μF, 25V
C418		ECEA50ZR33R	Electrolytic, 0.33μF, 50V
C419, 420		ECQM1H272KZ	Polyester, 0.0027μF, 50V, ±10%
C501, 502		**ECEA1CS102**	Electrolytic, 1000μF, 16V
C503	⚠	ECKD1H223ZF	Ceramic, 0.022μF, 50V, +80 −20 %
C504		**ECEA1JS4R7**	Electrolytic, 4.7μF, 63V

■ REPLACEMENT PARTS LIST AND EXPLODED VIEW

NOTES: 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2. ⚠ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.		Part No.	Part Name & Description
		CABINET and CHASSIS PARTS	
1		SBN779	Knob, Tuning Control (with M'tg Screw)
2		SBC207-1	Button, Power Switch
3		SUS123-2	Spring, Push Switches Button
4		SBC205-1	Button, Push Switches
5		SGWTC01D	Panel, Front Ass'y (with Cabinet) Except products for [X, XA, XAL, XE]
5[X,XA,XE] only		SGWTC01X	Panel, Front Ass'y (with Cabinet)
5[XAL] only		SGWTC01L	Panel, Front Ass'y (with Cabinet)
6		SHR9431	Cushion, Stereo & Servo Lock Indicators
7		SDZ051-2	Cord, Dial 130 cm (51¼")
8		SWV5-1	Pointer, Dial (with Tuning Indicator)
9		SHP31-1	Paper, Pointer Slide
10		**RDR20-3**	Pulley, Dial Cord
11		RNW150-2	Washer, Pulley Lock
12		SDT8051	Shaft, Tuning Ass'y (with Flywheel)
13		SDD9021	Drum, Tuning Gang
14		SDSA4121	Spring, Dial Cord
15		SJR205	Terminal Strip, 2 pin
16		RJT202B	Lug, Ground
17		SJF4419-3	Terminal, Antenna
18		SMV125-1	Lug, Tuning Gang Earth
19		SJF3225A	Terminal, Output
20		SUS149	Spring, Pointer Lead Wire
21		SGPT C01X	Rear Panel, SGP1430-1A with Name Plate (SGT19370)
21 [E] only		SGP1430-1A	Rear Panel
21 [XAL] only		SGPTC01L	Rear Panel, SGP1430-1A with Name Plate (SGT20630)
22	⚠	RJA23ZC	AC Cord, with Plug
22 [XE] only	⚠	RJA45ZC	AC Cord
22 [XAL] only	⚠	QFC1208M	AC Cord, with Plug
23		SHR127	Bushing, AC Cord
23 [XE] only		SHR129	Bushing, AC Cord
24		RHR110	Bushing, P.T. Secondary Lead Wire
25		SKU7290-1	Bottom Board
25 [XAL] only		SKU7290	Bottom Board
26		SHS2411	Fiber, Front Side Feet
27		SKX259	Stand Foot, Front Side
28		SHG1493	Rubber Cushion, Stand Feet
29		SKL217	Foot, Front Side
30		SHG1485	Rubber Cushion, Front Feet
31		SHR5013	Washer, Rear Side Feet
32		SGX803	Ring, Rear Side Feet
33		SHG1487	Foot, Rear Side
34		SHR9441-1	Cover, Transparency
35		SHR5015-1	Sheet, Dial Pointer Protection
36		SNWA351	Washer, Tuning Gang M'tg Lug
37		SHG6051-1	Rubber, Power Transformer Spacer
37 [XAL] only		SHG6025	Rubber, Power Transformer Spacer
38		SMX237	Spacer, Terminal Strip, Except Product for [XAL]
39		SHR301	Clamp, Lead Wire, Except product for [XAL]
40		SHR575	Spacer, Power Transformer Except product for [XAL]
41 [XE] only		SJFA5101	Holder, Fuse
		SCREWS and WASHERS	
50		**XSN3+8S**	Screw, Push Switches M'tg
51		**XWA3B**	Washer, Spring
52		**XTB3+8BFZ**	Screw, P.C.B & Earth Lug M'tg
53		**XWC3B**	Washer
54		**XTN3+8B**	Screw, Power Transformer M'tg
55		**XWG3**	Washer
56		**XTN3+8BFZ**	Screw, Spring M'tg
57		**XWG3FZ**	Washer
58		**XTB3+8BFN**	Screw, Bottom Board & Rear Panel M'tg
59		**XSS3+6S**	Screw, Feet M'tg
60		**XTB3+6BFZ**	Screw, Voltage Adjuster Switch M'tg Except product for [XAL]
61		**XTB3+8BFZ**	Screw, Voltage Adjuster Switch M'tg Except product for [XAL]
62		**XTN3+8B**	Washer, Fuse Holder



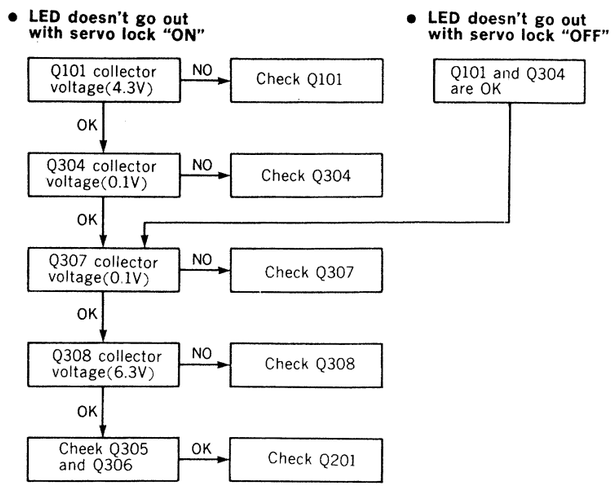
only products for United Kingdom [XE]

only products for Australia [XAL]

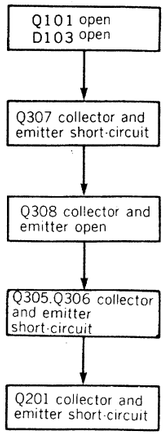
(E) and (EG) are available in Scandinavia and European only.
(X) and (XA) are available in Asia, Latin America, Middle East and Africa only.
(XAL) is available in Australia only.
(XGH) is available in Holland only.
(XGF) is available in France only.
(XE) is available in United Kingdom only.
(EB) is available in Belgium only.

■ TROUBLESHOOTING OF TUNING INDICATOR

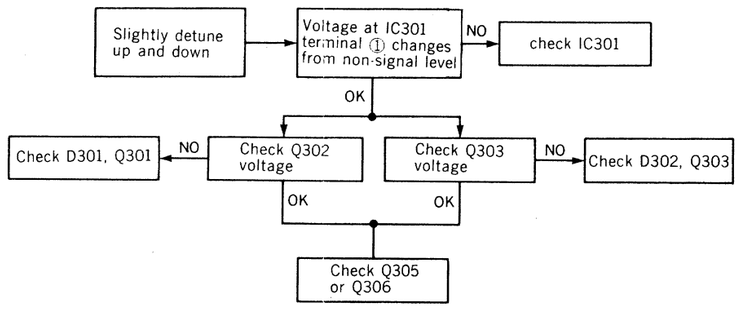
1. The tuning LED(Light Emitting Diode) doesn't go out with stereo signal received.



2. The tuning LED doesn't light up in no signal mode.

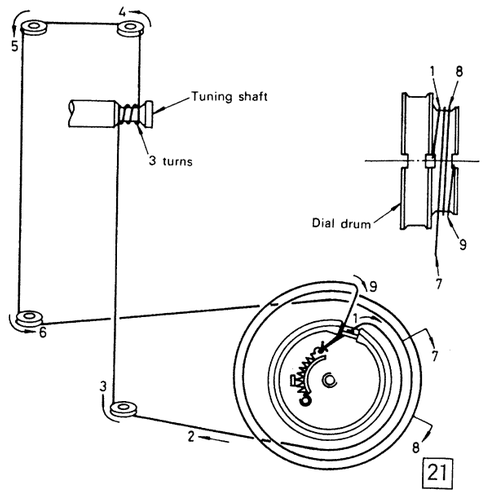


3. Only one tuning LED goes out with stereo signal received.

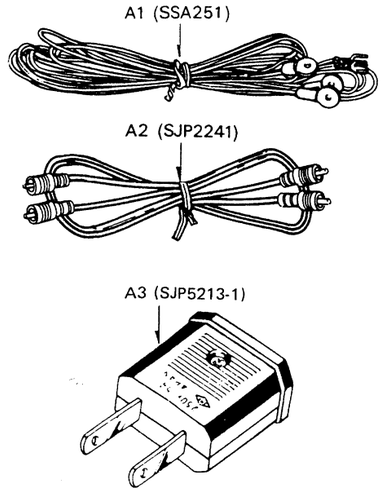


■ DIAL CORD INSTALLATION GUIDE

- For threading a fresh cord, proceed as follows.
  1. Prepare a fresh cord more than 130 cm (51-1/4") in length.
  2. Bring the variable capacitor into a state where the drum is completely turned to the right (maximum capacity and lowest frequency for the variable capacitor).
  3. Direct the cord in the order from 1 to 9.
  4. Stretch the cord in such a tension as the spring length is elongated by 1.5 times that of the original state.
  5. Fix the knot of the cord with the bond.

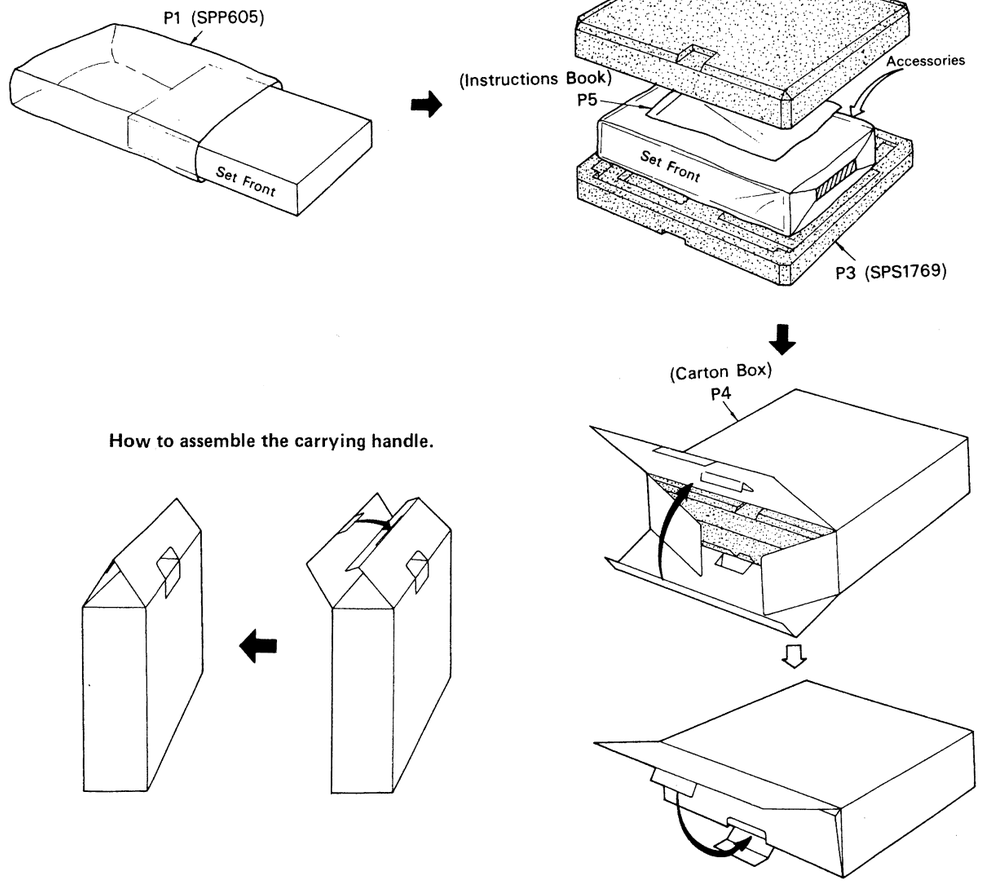


■ ACCESSORIES



Ref. No.		Part No.	Part Name & Description
ACCESSORIES			
A1		SSA251	Cord, FM Indoor Antenna
A2		SJP2241	Cord, Connection
A3 [X, XA] only	⚠	SJP5213-1	Plug Adapter, Power Source
PACKING PARTS			
P1		SPP605	Polythylene Bag
P2		SPS1771-1	Pad, Upper Side
P3		SPS1769	Pad, Lower Side
P4 [E, EG]		SPG1919	Carton Box
P4 [XE, X, XA, XAL, XGH, EB]		SPG1921	Carton Box
P4 [XGF]		SPG1293	Carton Box
P5		SQF10155	Instructions Book, Printed Matter

■ PACKINGS



How to assemble the carrying handle.

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